Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1-40. (canceled)

41. (currently amended) A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional user-specified basis function including overlapping portions that are disposed at a plurality of locations and overlap with one another to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional user-specified basis function to obtain a distribution of the overlapping portions that are disposed at the plurality of locations, each overlapping portion representing a two-dimensional treatment portion to be applied to a tissue and combined with other overlapping portions to achieve the three-dimensional target profile for treatment of the tissue according to the distribution obtained from the fitting.

42. (original) The method of claim 41 wherein the three-dimensional profile has symmetry with respect to a two-dimensional section oriented radially from an axis of symmetry and extending in a generally circular treatment pattern around the axis.

43. (currently amended) [[The method of claim 42]] A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions;

wherein the three-dimensional profile has symmetry with respect to a two-dimensional section oriented radially from an axis of symmetry and extending in a generally circular treatment pattern around the axis;

wherein the overlapping portions are generally circular, and the two-dimensional basis function comprises discrete basis functions each representing a coverage angle of one of the overlapping portions as a function of a distance from the axis of symmetry.

44. (original) The method of claim 41 wherein the three-dimensional profile has symmetry with respect to a two-dimensional section oriented normal across a generally straight treatment pattern.

45. (currently amended) [[The method of claim 44]] A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions;

wherein the three-dimensional profile has symmetry with respect to a two-dimensional section oriented normal across a generally straight treatment pattern;

wherein the overlapping portions are generally circular, and the two-dimensional basis function comprises discrete basis functions each representing a depth of one of the overlapping portions as a function of a distance from the axis of symmetry.

46-56. (canceled)

57. (currently amended) The method of claim 41 wherein the basis function includes *M* discrete basis functions representing *M* overlapping portions.

58. (currently amended) [[The method of claim 57]] A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions;

wherein the basis function includes *M* discrete basis functions representing *M* overlapping portions;

wherein the *M* discrete basis functions represent *M* overlapping portions across a treatment zone length representing the length across a generally two-dimensional section which is oriented normal across a generally straight treatment pattern or which is oriented radially across a generally circular treatment pattern.

59. (previously presented) The method of claim 58 wherein the overlapping portions are generally circular and have a generally uniform energy profile.

60. (previously presented) The method of claim 59 wherein

(A) for a treatment profile having a generally uniform two-dimensional section oriented normal across a generally straight treatment pattern, the discrete basis functions represent the two-dimensional section as

$$X_i(x_j) = y_i(x_j) = \sqrt{(s/2)^2 - (x_j - x_{0i})^2} \text{ or}$$

(B) for a treatment profile having a generally uniform two-dimensional section oriented radially across a generally circular treatment pattern, the discrete basis functions represent the two-dimensional section as

$$X_i(x_j) = \theta_i(x_j) = \cos^{-1}\left(\frac{x_j^{\,2} + x_{0i}^2 - (s/2)^2}{2 \cdot x_{0i} \cdot x_j}\right)$$

where

s is the diameter of the overlapping portion;

$j = 1,...,N$;

x_j is a reference x-coordinate for the two-dimensional section measured from an optical axis of the cornea of a j^{th} evaluation point for the center of the overlapping portion;

x_{0i} is an x-coordinate for a center of an i^{th} overlapping portion;

$(x_{0i} - s/2) \leq x_j \leq (x_{0i} + s/2)$;

$y_i(x_j)$ is a depth of the i^{th} basis function for the generally straight treatment pattern; and

$\theta_i(x_j)$ is a coverage angle of the i^{th} basis function for the generally circular treatment pattern.

61. (previously presented) The method of claim 60 wherein x_{0i} is specified for M number of equally spaced overlapping portions as $x_{0i} = i * [\,(L - s + e) / M\,]$,

where

L is the treatment zone length;

e is an extended zone; and

$i = 1,...,M$.

62. (previously presented) The method of claim 61 wherein e is set to about 0.1 to about 0.5 mm.

63. (currently amended) [[The method of claim 57]] A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions;

wherein the basis function includes *M* discrete basis functions representing *M* overlapping portions;

wherein *M* is equal to about 7 to about 97.

64. (currently amended) ~~The method of claim 57 further comprising~~ A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern;

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions, wherein the basis function includes *M* discrete basis functions representing *M* overlapping portions; and

refitting the target function with the basis function by varying the number of overlapping portions *M* to iterate for a best fit.

65. (currently amended) [[The method of claim 41]] A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions;

wherein the target function is:

(A) for myopia and myopic cylinder,

$$f(x_j) = \sqrt{R_1^2 - x_j^2} - \sqrt{\left(\frac{R_1(n-1)}{n-1+R_1D}\right) - x_j^2} + C \text{ or}$$

(B) for hyperopia and hyperopic cylinder,

$$f(x_j) = R_1 - \frac{R_1(n-1)}{n-1+R_1D} - \sqrt{R_1^2 - x_j^2} + \sqrt{\left(\frac{R_1(n-1)}{n-1+R_1D}\right) - x_j^2} \text{ or}$$

(C) for phototherapeutic keratectomy,

$f(x_j) = d$;

where

$$0 \leq x_j \leq (L - shift);$$

$$j = 0,1,\ldots,N\text{-}1;$$

$$C = \sqrt{R_1^2 - s^2/4} + \sqrt{\left(\frac{R_1(n-1)}{n-1+R_1D}\right) - s^2/4};$$

x_j is an x-coordinate measured from an optical axis of the cornea of the j^{th} evaluation point for the center of the overlapping portion;

s is the diameter of the overlapping portion;

R_1 is the anterior radius of curvature of the cornea in meters;

R_2 is the final anterior radius of curvature of the cornea in meters;

$n = 1.377$ is the index of refraction of the cornea;

D is the lens power of the overlapping portion in diopters;

L is the treatment zone length representing the length across a generally uniform section which is oriented normal across a generally straight treatment pattern for myopic or hyperopic cylinders, or which is oriented radially across a generally circular treatment pattern for myopia or hyperopia;

shift is the amount of emphasis shift; and

d is a constant depth.

66. (previously presented) The method of claim 65 wherein the shift is about 0 to about 0.2.

67. (previously presented) The method of claim 65 wherein $x_j = j * [(L - shift) / N]$.

68. (previously presented) The method of claim 65 wherein the basis function includes M discrete basis functions representing M overlapping portions, and wherein fitting the target function with the basis function comprises solving the following equation for coefficients a_i representing treatment depth for the i^{th} overlapping portion:

$$f(x_j) = \sum_{i=1}^{M} a_i X_i(x_j)$$

where

$X_i(x_j)$ is the i^{th} basis function; and

$i = 1, \ldots, M$.

69. (currently amended) [[The method of claim 41]] A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions;

wherein fitting the target function and the basis function comprises specifying a deviation for each of the N discrete evaluation points.

70. (previously presented) The method of claim 69 further comprising refitting the target function with the basis function by varying the deviations to iterate for a best fit.

71. (currently amended) [[The method of claim 41]] A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions;

wherein fitting the target function and the basis function comprises evaluating closeness of the fit and repeating the fitting step if the closeness does not fall within a target closeness.

72. (currently amended) [[The method of claim 41]] A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions;

wherein the target function and the basis function are fitted using a least square fit.

73. (currently amended) ~~The method of claim 41 further comprising~~ A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern;

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions; and

refitting the target function with the basis function by varying the size of at least one of the overlapping portions to iterate for a best fit.

74. (currently amended) [[The method of claim 41]] A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions;

wherein the overlapping portions have different sizes.

75. (currently amended) [[The method of claim 41]] A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions;

wherein the target function and the basis function are fitted using a simulated annealing process.

76. (currently amended) ~~The method of claim 41 further comprising~~ A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern;

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions; and

specifying a merit function representing an error of fit between the target function and the basis function; and minimizing the merit function.

77. (currently amended) ~~The method of claim 41 further comprising~~ A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern;

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions; and

refitting the target function with the basis function by selecting an overlapping portion location and varying the characteristics of the overlapping portion at the selected location to iterate for a best fit.